

Peace River High School

Applied Mathematics 30 Course Outline and Long Range Plans

September 2011

Mrs. R. Castelino

Applied Mathematics 30 Course Outline and Long Range Plans for Semester 1, 2011

Course Philosophy

The Applied Mathematics 30 course emphasizes the application and relevance of mathematics in daily life. In applied mathematics, the program is primarily data driven, using numerical and geometrical problem-solving techniques. Algebraic constructs are addressed as a result of activities and develop mathematical concepts from analyses of the data. Technology is an integral part of applied mathematics. The graphing calculator is the primary technological tool used by students for mathematical exploration, modeling and problem solving.

Students are expected to communicate solutions to problems clearly and effectively when solving both routine and non-routine problems. Technology is to be used for exploration, modelling, and problem solving. Students are also expected to apply mathematical concepts and procedures to real life.

Information bulletin 2002-2003
Alberta Learning

General Expectations

As this is a diploma course, students are expected to abide by the following expectations:

- ⊕ **Regular attendance** – To be successful in Applied Math 30, the student must be attending classes and completing the work associated with learning the concepts and skills of the course. The student is responsible for getting notes and doing the work that was assigned if they are absent/late. If the student knows that they will be away, please notify the teacher so the student can pick up their work so they do not fall behind.
- ⊕ **Arrive on time** – It is expected that you are in your desk ready to start class when the bell goes. If you are unable to avoid being late, please enter the classroom with a minimum of disruption.
- ⊕ **Be prepared** – Books, pencils, calculators, etc. are to be brought to class everyday. Handouts, quizzes, assignments, notes and exams are to be kept in order in a binder.
- ⊕ **Work Habits** – It is expected that the student use their class time to the best of their abilities for the whole period every class. I expect everyone to be listening when I am providing instruction. Please raise your hand and ask questions at any time during the class. Respectful behaviour is a necessity to all members of the class and shall be reciprocated.

- ⊕ **Homework/Exams** – Homework assignments are due at the end of the assigned class. It is the student's responsibility to make up for any work missed during an absence. If an exam or quiz is missed due to an excused absence, the student will be allowed to write the exam on his or her own time.
- ⊕ **Late Homework** – Late homework will be accepted until such time as the rest of the assignments are marked and returned to the class with a penalty of 10%. Once an assignment is marked and returned, the maximum credit that can be earned is 50%. If you are absent and unable to hand in the homework, you will be expected to hand it in *immediately* upon your return.
- ⊕ **Help Sessions** – If you experienced any particular troubles in Applied Mathematics 30, you should make arrangements to work after school in tutorial sessions. **Extra help is available before school, during lunch and after schools. Make sure you sign up for extra help at least one day in advance.**
- ⊕ **Attitude** – Another necessity for this course is independence and accountability. You are responsible for keeping up with the homework, asking for help if needed, and studying for tests. This class is preparing you for post-secondary education, which requires all of these.

Course Outline

The following is the course outline listing the approximate percentage of time spent on each unit, the approximate time line, specific outcomes (from Alberta program of studies), and related chapters in the textbook.

- I. **Probability and Statistics** (17%): September 2nd – September 20th
Chapter 1/3 (13 classes)
 - Find the population standard deviation of a data set, using technology.
 - Use z-scores to solve problems related to the normal distribution
 - Use the normal approximation to the binomial distribution to solve problems involving confidence intervals for large sample binomial experiments.
 - Construct a sample space for two or three events.
 - Classify events as independent or dependent
 - Use expressions for $P(A \text{ and } B)$ to solve problems involving independent and dependent events.
 - Solve problems using the probabilities of mutually exclusive and complementary events.

II. Matrices and Pathways (17%): September 21st – October 12th
Chapter 2 (14 classes)

Specific Outcomes:

- Solve pathway problems, interpreting and applying any constraints.
- Use the fundamental counting principle to determine the number of different ways to perform multistep operations.
- Perform, using technology only for larger matrices, the matrix operations of addition, subtraction, matrix multiplication and multiplication by a scalar.
- Model and solve consumer and network problems, performing matrix operations and using algebraic solution strategies as needed.

III. Cyclic, Recursive, and Fractal Patterns (18%): October 13th – November 3rd
Chapter 5/6 (15 classes)

Specific Outcomes:

- Collect sinusoidal data, graph the data using technology, and represent the data with a best-fit equation of the form:
$$y = a \sin (bx + c) + d$$
- Use best-fit sinusoidal equations, and their associated graphs, to make predictions by interpolation and extrapolation.
- Describe periodic events, including those represented by sinusoidal curves, using the terms amplitude, period, maximum and minimum values, and vertical and horizontal shift, and relating these terms to the parameters a , b , c and d described in 4.1.
- Use technology to generate and graph sequences that model real-life phenomena.
- Use technology to construct a fractal pattern by repeatedly applying a procedure to a geometric figure.
- Use the concept of self-similarity to compare and/or predict the perimeters, areas and volumes of fractal pattern.

IV. Vectors (18%): November 4th – November 24th
Chapter 7 (14 classes)

Specific Outcomes:

- Use appropriate terminology to describe vector quantities, scalar quantities.
- Assign meaning to the multiplication of a vector by a scalar.
- Determine the magnitude and direction of a resultant vector, using triangle or parallelogram methods.
- Model and solve problems in 2-D and simple 3-D, using vector diagrams and technology.

V. Finance and Spreadsheets (17%): November 25th – December 9th
Chapter 4 (11 classes)

Specific Outcomes:

- Design a financial spreadsheet template to allow users to input their own variables.
- Analyze the costs and benefits of renting or buying an increasing asset, such as a home.
- Analyze the costs and benefits of leasing or buying a decreasing asset, such as a vehicle or a computer.
- Analyze an investment portfolio, applying such concepts as interest rate, rate of return and total return.

VI. Design (13%): December 12th – December 21st (8 classes)

Specific Outcomes:

- Use dimensions and unit prices to solve problems, involving perimeter, area and volume.
- Solve problems involving estimation and cost for objects, shapes or processes when a design is given.
- Use appropriate variables to design an object, shape, layout or process within a specified budget.

VII. Review: Last few days of the class

These dates are approximate and subject to change if necessary.

Materials

Every student is required to have a Texas Instrument TI-83 or TI-83+ Graphing Calculator for this course. The textbook for the course is Applied Mathematics 12 (Addison Wesley). The course will also be supplemented from other resources.

Evaluation Breakdown:

Evaluation (per Unit)		Course Evaluation	
		Statistics an Probability	15%
Class performance/Quizzes	25%	Matrices and pathways	16%
Assignments	25%	Cyclic, Recursive and Fractal patterns	16%
Unit Tests	50%	Vectors	16%
		Finance and Spreadsheets	15%
		Design	12%
		Mid term Exam	10%
		Total	100%

Evaluation consists of two major components: term work, worth 50% of the final grade and the diploma exam, worth 50% of the final grade. The term work consists of the weighted average of the six units (as listed above in the course outline.)

Homework and Assignments:

Besides a daily demonstration of a willingness to participate in class activities and exercises, the student who attends regularly and shows a consistent, conscientious effort towards the course material will do well here. Homework will be assigned on a daily basis with an expectation that it is completed for the next day. Assignments and/or projects may be given weekly and due on the assigned date.

Quizzes and Unit Tests:

Quizzes will occur about twice a chapter and may not always be announced. Unit tests will pertain to the current and may include past units.

Midterm and Diploma Exams:

The midterm exam is scheduled for 9-11-2011 and will cover the material taught up to that date. The diploma exam serves as the final exam in the course and is scheduled as follows:

Diploma Examinations:

Please note the format for the diploma examinations

Applied Mathematics 30 Wednesday, January 25th, 2012

9:00 – 11:00 a.m

33 Multiple Choice- worth 82%

7 Numerical Responses – worth 18%

Diploma Examination Content	% Emphasis
Statistics and Probability	17
Matrices and pathways	17
Cyclic, Recursive and Fractal patterns	18
Vectors	18
Finance and Spreadsheets	17
Design	13

Teaching Techniques

The instructional strategies will include lecture, question and answer discussions, small group work, investigative group work and some individual tutoring. Students will be expected to do assignments almost every class. Some of the assignments will be done entirely within the set time limits of the 67-minute classes but most will be started in class and finished for homework.

Weekly quizzes will concentrate primarily on the material covered in the past five classes and secondarily on the material from the current unit. Unit exams will cover material primarily from the current unit and secondarily from prior units. The midterm exam will cover material from the beginning of the semester. Projects will cover one or more topics from the course. Continuous review will be encouraged with some longer term assignments and some test questions from previous units.

Extra help is available before school, during lunch and after schools.

If you have any questions regarding the information contained in this course outline, please do not hesitate to contact myself at the school.

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Peace River High School

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